

|   | Inches. |
|---|---------|
| Longitudinal diameter of orbit.....                                     | .58     |
| Length of lower jaw, in straight line.....                              | 1.42    |
| Length of upper jaw, in straight line.....                              | 1.15    |
| Tip of snout to insertion of pectoral, about.....                       | 3.00    |
| Tip of snout to origin of dorsal, along axis of fish.....               | 3.62    |
| Tip of snout to origin of dorsal, along dorsal profile.....             | 4.03    |
| Tip of snout to origin of anal, along axis of fish.....                 | 6.45    |
| Tip of lower jaw to insertion of ventrals, along abdominal profile..... | 3.32    |
| Width of pectoral base.....   | .90     |
| Length of pectorals.....  | 2.40    |
| Length of ventrals.....   | 1.50    |
| Length of base of 1st dorsal to XIIth spine.....                        | 2.08    |
| Height of longest (4th) dorsal spine.....                               | 1.25    |
| Length of base of 2d dorsal.....  | 2.60    |
| Height of longest (3d) ray of dorsal.....                               | 1.44    |
| Length of base of anal.....   | 1.62    |
| Height of longest (1st) ray of anal.....                                | 1.38    |

*Fin formula.*—B. 7; D. XII + 11,  $\frac{1}{15}$ ; A.  $\frac{2}{11}$ ; P. 18; V.  $\frac{1}{5}$ ; C. lat. line circa 128-134.

**DESCRIPTION OF A NEW SPECIES OF RAY, *RAIA RHINA*, FROM THE COAST OF CALIFORNIA.**

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*Raia rhina*, sp. nov.

Disk rather broader than long, the snout very sharp and long-acuminate. Outer angle of pectoral sharp; posterior edge of pectoral nearly straight. Region from pectoral angle to snout slightly convex, then almost uniformly and *strongly concave* to near the tip of the snout, which tapers to a sharp point. A straight line from the snout to the tip of the pectoral passes far from the edge of the disk. Length of snout nearly four times the interorbital width.

Interorbital space quite narrow, very little concave, somewhat depressed in the middle. Nasal ridges separated for more than half their length. Supraocular ridges slightly elevated. Eyes larger and much longer than spiracles. Ventral fins deeply cmarginate. Caudal fin reduced to a small fold. Dorsal fins moderate, rather close together, the interspace less than the base of the fin.

*Female* with the spines on the body moderately strong, arranged as follows:

Five or six rather strong spines above the eyes. Two in front of the center of the back. None along the middle line of the back until opposite the *posterior end of the ventrals*, where a median series begins on the tail. A lateral caudal series on each side, and two or three long sharp spines between the dorsal fins.

Roughnesses on the skin above rather large, sharp-pointed, and evidently stellate. Those on the snout especially conspicuously stellate and larger than the others. These prickles are *everywhere present* on the

upper parts of the body, but they are not evenly distributed, and in most regions they are placed quite wide apart. They are largest and most numerous on the nasal ridges, interorbital space, middle region of back and tail, and anterior part of pectorals. On the base and edges of the pectorals and on the ventrals the prickles are few and small. On the middle portion of the pectorals they are rather numerous. Under-side of disk everywhere prickly except along the edges of the fins; the prickles largest under the snout.

Male not seen, probably differing, as in the other species, in the sparser prickles above, in the absence of a lateral caudal series, and in the presence of stouter prickles on the anterior part of the pectorals and of claw-like spines on the posterior part. Mouth somewhat arched. Teeth about  $\frac{4}{6}$ . Nasal flap rather less than half the width of the mouth.

Coloration essentially as in *Raia binoculata*. Light brown above, vaguely mottled with paler; the usual dark ring at the base of the pectorals most distinct in fresh examples, and probably in the young.

This species is known to us from three examples. Adult females, 26 to 29 inches in length. One from Monterey Bay and two from San Francisco Bay. The one from Monterey was referred to in our description of *Raia stellulata* as a long-nosed form or variety of *Raia binoculata*.

*Raia rhina*, is related to *Raia cooperi* and *Raia binoculata*. From the latter it differs in the much sharper and longer snout, in the less concave interorbital space, and in the much greater roughness of the body, the small prickles, even in the female of *R. binoculata*, being confined to the snout, interocular space, and a portion of the median region of the back and the tail, the fins being perfectly smooth. The male has the usual patches on the pectoral fins, and the back almost or quite smooth.

From *Raia cooperi*, *Raia rhina* differs in the much smaller size in length, the adult of *Raia cooperi* reaching at least a length of more than six feet. It also differs in form, color, interorbital width, armature, &c., as will appear from the following description of a young male example of *Raia cooperi*, 27½ inches in length, from San Francisco.

Disk broad, its *widest part much behind the middle*, the pectoral angle rather sharp, and the posterior edge very little convex. The anterior margin of the pectoral is at first slightly convex, then concave, then, opposite the eyes, again very slightly convex, then again slightly concave; the snout itself not very sharp, although long.

Interorbital space very broad and almost flat (deeply concave in *R. binoculata*), only slightly depressed in the middle, the nasal ridges well separated for usually two-thirds their length. Supraocular ridge not at all elevated. *Eyes quite small*, shorter than the spiracles.

Ventral fins not deeply emarginate (becoming more deeply emarginate in the adult). Caspers, in this example (which, although larger than the adults of the other species, is evidently immature), very small, scarcely exerted beyond the ventral edge. Claw-like pectoral spines not yet developed. Caudal fin wanting. Dorsal fins moderate, not far

apart, the interspace less than the length of the base. Tail with a slight lateral fold.

Spines on body small and few. Two or three very small ones over the eye, one at the center of the back, with a minute one in front of it. None along the median line of the back, the median caudal series beginning at the base of the ventrals. These spines are quite small, but grow larger backward.

Asperities above in the form of minute prickles, somewhat stellate. These are very minute, except along the median line of the back and tail, and there they are smaller than in *R. stellulata* or *R. rhina*. Tail entirely prickly above. A broad band of prickles along back to inter-orbital space. Entire pectoral fin minutely prickly, rather coarsely so anteriorly. Nasal ridges prickly.

Ventrals mostly covered with minute prickles, as is the under side of the snout and the region around the mouth. A row of rather coarser prickles along the edge of the disk anteriorly, on the under side.

Jaws rather strongly curved. Teeth somewhat tricuspid,  $\frac{4}{3}$ .

Length of nasal flap about half the width of the upper jaw.

Body light brown, with many rather large, faint, round whitish spots, which are very distinct in the young. A vague blackish ring at base of pectoral.

*Raia cooperi* is rather common from Monterey Bay to Vancouver's Island, and probably north to Alaska. It is often brought into the markets of San Francisco with the *binoculata*. We have seen examples of all sizes from six inches to six feet in length. A skin of an individual six feet in length was obtained by us at Victoria. In its stomach were two specimens of *Cottus polyacanthocephalus*, each a foot long. Thus far no examples of any of the other species over 2½ feet in length have been noticed.

Table of measurements.

|  | <i>R. rhina</i> ♀, Monterey. | <i>R. rhina</i> ♀, San Francisco. | <i>R. cooperi</i> ♂, juv., San Francisco. | <i>R. binoculata</i> ♂, Monterey. | <i>R. binoculata</i> ♀. | <i>R. binoculata</i> ♂, San Francisco. | <i>R. stellulata</i> ♀, Monterey. |
|--|------------------------------|-----------------------------------|---|-----------------------------------|-------------------------|--|-----------------------------------|
| Extreme length, in inches.....                 | 23.80                        | 26.25                             | 27.65                                     | 21.6                              | 23.45                   | 24                                     | 17.45                             |
| Length of disk, in inches=100.....             | 18.40                        | 16.85                             | 17.3                                      | 13                                | 14.90                   | 13.65                                  | 10.10                             |
| Disk, greatest width.....                      | 103                          | 111                               | 119                                       | 106                               | 113                     | 113                                    | 121                               |
| Width midway between snout and mouth.....      | 14                           |                                   |   | 16.7                              |                         |  | 41                                |
| Width at front of eyes.....                    | 41                           |                                   |   | 45.5                              |                         |  | 58                                |
| Distance from snout to pectoral angle.....     |                              | 77.5                              | 86.5                                      |                                   | 78.5                    | 77                                     |                                   |
| Distance from snout to first gill-opening..... |                              |                                   |   | 50.5                              |                         |  |                                   |
| Distance from snout to mouth.....              | 30                           | 29.5                              | 24  | 2.5                               | 25                      | 21                                     | 24                                |
| Distance from first to last gill-opening.....  | 12                           | 17                                | 13.5                                      | 12.8                              |                         |  | 14                                |
| Width of mouth.....                            | 15.5                         | 14.5                              | 15.5                                      | 15                                | 15.5                    | 15.5                                   | 18                                |
| Distance between nostrils.....                 |                              | 13.2                              | 15  |                                   | 13.5                    | 12.5                                   |                                   |
| Diameter of orbit.....                         | 5.5                          | 6                                 | 5   | 5.5                               | 7.5                     | 7                                      | 8                                 |
| Length of snout from eye.....                  | 31                           | 30.5                              | 28.5                                      | 23                                | 27.3                    | 23.5                                   | 23                                |
| Length of nasal flap.....                      |                              | 7                                 |   |                                   | 8.5                     | 8                                      |                                   |
| Distance between first gill-openings.....      | 26.3                         | 25.5                              |   | 25.5                              | 26.5                    | 25                                     | 31.5                              |
| Distance between last gill-openings.....       | 16.5                         | 17                                | 17.5                                      | 14.3                              | 16.5                    | 15                                     | 18                                |
| Interorbital width.....                        | 8                            | 8                                 | 10.5                                      | 8                                 | 7.5                     | 7.8                                    | 8                                 |
| Tail, length.....                              | 57                           | 55                                | 60  | 67                                | 56.5                    | 80                                     | 71.5                              |
| Distance between dorsals.....                  | 3                            | 3.5                               | 3   | 3.8                               |                         | 10.5                                   | 5                                 |